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JOHN VAN VOORST, PATERNOSTER ROW.

THE ZOOLOGIST

FOR 1855.

Memoranda of Observations made in small Aquaria, in which the Balance between the Animal and Vegetable Organisms was permanently maintained. By Robert Warington, Esq.[*]

Fresh Water. Memorandum 1.—In my communication, dated September, 1852,[†] I gave a detailed account of my observations on the thread or web which some species of the fresh-water snail form to effect or facilitate their passage from one spot or object to another, and thus either ascending or descending by its means; and the instances noticed up to that period had reference only to the varieties of the Limneæ. In continuation of my observations on the same subject, I have now to state that the varieties of Planorbis, as also Neritina fluviatilis and Physa fontinalis, have, since that date, been noticed to possess the same power; and in the case of the latter, Physa fontinalis, the thread or web was so tough and strong, that on one occasion I was able, by means of a small rod introduced between the creature and its point of attachment, to move it out of its straight course a considerable distance, and, by then slowly drawing the rod upwards, I succeeded in raising the snail completely out of the water a space of about seven inches, suspended by its thread, so that, under these circumstances, the thread itself became distinctly visible.

From the observations which I have been enabled to make, I consider that I am justified in stating that all the fresh-water snails are possessed of this power.

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[*] Read at the Liverpool Meeting of the British Association, and communicated by the author.

[†] Published in the 'Zoologist' for 1852, p. 3633.

BRITISH MUSEUM

Memorandum 2.—As an evidence of the permanency of the balance capable of being established between the animal and vegetable organisms by the introduction of the water-snail or other phytophagous mollusk, as I have elsewhere described,* I may state that the same water in which my original experiments were made in March, 1849, has been in continual use up to the present time, several fish living constantly in it, without disturbance, and that it is now as bright and in as healthy a state as at the first period of its being employed.

Again, in a small jar of about one pint capacity, having a single plant of Vallisneria spiralis growing healthily in it, and with a few small water-snails as scavengers, I succeeded, during the spring of 1853, in hatching and rearing a young trout. The egg was obtained from Mr. S. Gurney, jun., and had been removed from his preserves in the river Wandle; the shell ruptured the day after my receiving it, and it was maintained in a perfectly healthy state during the whole of the period required for the development of the respiratory organs, and the complete though gradual absorption of the ovum. This development was perfected in fifteen days from the bursting of the shell, till the period that the fish could sustain itself contiuously in the water and was able to swim strongly. Having arrived at this stage of maturity, the vessel became far too small for the free use of its active powers of locomotion, and it was therefore transferred to a small tank containing several minnows, when, to my great annoyance, it was immediately seized and devoured.

As another instance of the voracity of the finny tribe and their destruction of each other, I may mention here that I had on a previous occasion placed several small trout fry over-night in an aquarium containing some gold-fish, but they must have been rapidly preyed upon, as no trace could be seen of them the following morning. These facts will demonstrate clearly the havoc which must take place in the rivers and streams among the young fry of various fish under ordinary circumstances, when they are proved to be devoured with such extraordinary rapidity even by such species as the gold-fish or carp tribe and the minnow.

Memorandum 3.—Care should be taken in the aquarium for fresh water to exclude the ordinary polype or Hydra fusca, particularly where certain species of fish are to be preserved, as with the minnow (*Leuciscus Phoxinus*), for these creatures, insignificant as they may appear, after a short time cause their death, and that under most extraordinary circumstances, as the following observations will tend to show:—In a small aquarium that had had gold-fish kept in it for a length of time, but which had been removed into one of larger dimensions and more fully exposed to the light, an enormous number of the Hydra fusca were observed to have made their appearance very soon after this removal. Wishing therefore to ascertain if the appearance and rapid increase of these polypes had been prevented by the gold-fish, the following experiments were made:—Fifteen individuals of the Hydra fusca were placed in the aquarium containing the gold-fish, but they very soon disappeared, having, I presume, been devoured by the fish; a second fifteen were then introduced, but with the same result. At the same time as this experiment was made, fifteen Hydras were placed in a tank containing four minnows (*Leuciscus Phoxinus*) and a pair of small eels, but as the minnows did not appear to touch them, the same number of polypes being counted over several times during a period of three weeks, they were soon forgotten altogether. After a space of about seven months had elapsed from this time, the minnows were observed to assume a most extraordinary aspect, the head appeared very much swollen, and the eyes of all of them looked as though starting out of their heads, being forced upwards and in an outward direction and much enlarged; by degrees the gills of some of them became streaked with bloody markings, and this gradually extended to the base of the pectoral fins. The whole appearance was most distressing to contemplate, particularly as it was impossible, from ignorance of the cause, to adopt any remedial measures. Judging from their appearance my impression was that they had been poisoned, and, assuming that it must have arisen from something putrescent which they might have raked out of the materials at the bottom of the aquarium, the whole of the water was drawn off clear by a syphon, the gravel and sand thoroughly washed, and everything replaced in the tank with the fish; no improvement, however, appeared to follow, the fish got worse and ultimately died. This was in June, 1853. Before this extraordinary change came on, the fish had been observed to cluster together in one particular secluded spot, and rarely came out as they had been accustomed to do, and when they did venture forth they rubbed or jerked themselves with much force against the gravel and rock-work, as though something was irritating the skin: nothing, however, was visible. I had had these fish for about eighteen months in the same aquarium. As the water was perfectly bright and clear, and free from all odour or unpleasant taste, I procured six fresh minnows and placed them in the tank; for about ten days they appeared to be pretty healthy: they did not, however, swim about freely, but herded together in one corner of the aquarium, and then the same extraordinary change gradually came on which had been observed in the others, and after lingering for seventeen days they all died. On carefully scrutinizing the different parts of the tank with a magnifying glass, my attention was at once arrested by observing the enormous number of the Hydra fusca which were present, particularly on the parts of the aquarium where the fish had been accustomed to feed; that is, along the water-line towards the light, at the base of the plants of Vallisneria spiralis, about half-an-inch above the gravel, and on the whole of the rock-work around the space where the minnows delighted to hide: here they might have been seen stretching out from the sides, hanging down from the top—in fact, in every possible direction: here, then, was a solution of all the evil. It now became a question how these pests were to be eradicated, and after canvassing in my mind a variety of suggestions, I determined to endeavour to remove them individually, and by this means they were speedily got rid of; from fifty to a hundred being taken out daily. The method by which this operation was effected was as follows:—A long glass capillary tube open at both ends was introduced into the water, having the finger kept tightly over the upper orifice, while, with the edge of the lower opening, the polype was detached from its hold; the moment this was effected and the Hydra began slowly to fall through the water, the finger was removed, and the water with the polype was thus rapidly driven into the tube by the pressure of the external column of water; on replacing the finger the contained water and polype were removed. By persevering in this course they were caught with the greatest rapidity and dropped into another vessel before they had time to attach themselves to the interior of the tube, falling through the water like a miniature parachute. When situated in places where this mode of capture could not be employed, as on the leaves of the Vallisneria or on the under sides of the rock-work, they were pulled off with a jerk by means of a small pair of forceps. In this manner between four and five hundred polypes were removed from a small aquarium holding about six gallons of water. Since this some small carp and also minnows have been placed in the same water, and have continued now for upwards of sixteen months in perfect health.

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* Published in the 'Zoologist' for 1850, p. 2868.

It is a curious problem as to the manner in which this destruction of life was brought about: my own impression is that the Hydras seized on the minnows whenever their extended tentacula were touched by the swimming fish,—stinging them, and causing a great degree of irritation; and that the polypes were torn from their position by the greater strength of the fish and carried to their places of retreat, where, by consequence, the mischief was continually accumulating. A similar removal from one place to another of an analogous creature, the young of the Actinia, takes place in sea water, from their attaching themselves by their tentacula to some moving denizen, the hold being released very soon after they are forced from their original attachment.

Sea Water. Memorandum 1.—In my previous experiments in this branch of the subject, commenced in January, 1852,* and of which some results were communicated to the British Association at their meeting last year at Hull,† I stated that the result of my experiments to ascertain the kind of sea-weed best fitted for maintaining the balance with the animal life was, under ordinary circumstances, in favour of the Chlorosperms, and that the Rhodosperms submitted to the like conditions did not answer the purpose desired and at the same time retain their colour and beauty, inasmuch as they very soon became coated with a growth of short green and brown Confervæ (*Conferva tortuosa?*), which entirely mantled the whole surface of the fronds and destroyed their characteristic appearance. During these investigations, however, it occurred to me that it might be possible to obviate this drawback, and I have, I believe, succeeded, after a series of experiments, in overcoming this inconvenience, and can now retain them in all their natural loveliness, and render them quite efficient for all the purposes required—that is, as consumers of carbonic acid and generators of oxygen.

The ground on which I have reasoned as a basis for these experiments has been the consideration, that nearly the whole of these red or pink-coloured sea-weeds are found either in deep water or under the shade of other Algæ, and from the fact that they were also often known to occur in shallow rock-pools: it was hence fair to assume that the pressure of the column of water could not be an important element in the production of these coloured growths, and therefore that it must depend upon a modification of the light. Hence my idea was that the effects of the depth of the water might be capable of being imitated by tinting the light through the interposition of coloured media, and thus all the results observed in the vegetation, and much even of the healthy animal life of deep sea water could be, under this arrangement, assimilated; and this, I am happy to state, has proved experimentally to be the case, so that, by very simple means and with very little trouble, we shall be enabled to grow and preserve these elegant and beautiful plants in all their varied hues, as well as many of the wondrous forms of animal life usually found associated with them, for any length of time; and thus a much enlarged field for observation will be brought within the limits of our aquarium.

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* 'Garden Companion,' January, 1852.

† 'Zoologist' for 1853, p. 4118.

In order to obtain this desideratum, a medium having a blue or green tint has been had recourse to, and of such a nature as merely to colour, soften or diffuse the light, without materially diminishing its quantity. This was at first accomplished by the employment of a thin film of paint of the desired shade, of a thin silk gauze of a blue colour, by layers of tissue paper tinged blue and green, sometimes oiled to render them more transparent, at others the sheets of paper being superposed until the desired effect was produced, or by coloured varnishes, blue, and blue and yellow, and mixed to the tint required. These materials should be applied to the surface of the glass, or interposed between the source of light and the water, in such a way that the whole of the light which directly illuminates the aquarium may be tinted of the proper colour. In proportion to the quantity of light at command and the varying aspect to the sun's rays, so must the transparency of the colouring medium be adjusted. In my own case I have been obliged partially to employ coloured glass, as the other methods were found to impede too much of the direct light; but it must be borne in mind that this is in the midst of a crowded city, in a smoky atmosphere, and surrounded by tall houses. To such an extent has this plan succeeded, that several small attached pieces of delicate red sea-weed which I had received in October, 1852, and had become thickly mantled with the brown and green confervoid growth already alluded to, and which had not exhibited the least signs of vitality, on being placed in a small glass jar arranged with tinted and oiled tissue-paper, soon lost the whole of this parasitic growth, from its gradually decaying and being then consumed by the mollusks, the fronds assuming their deep crimson hue, becoming perfectly clear, and even after so long a period throwing out numerous young shoots or leaflets; and on one of these pieces several beautiful specimens of the Coryne sessilis made their appearance, together with groups of Lepralia and corallines.

Memorandum 2.—Another very interesting experiment that I have had progressing very successfully for some time past, is the preserving sea water in a perfectly transparent and healthy state without the use of vegetation of any kind, or, in some cases, even of a scavengering mollusk. The adoption of these experiments was in a great degree forced upon me from circumstances which have been already published. In the paper read before the Meeting of the British Association at Hull, I stated that in consequence of the ravenous propensities of the crabs and the varieties of rock-fish, I had been obliged to establish several small imitation rock-pools, so as to separate these various depredators from each other; and as some of these, the blennies, also attacked the common periwinkle and other mollusks which were employed as scavengers, the plant or vegetation consequently became of little use, and was therefore omitted altogether from the arrangement. It may be asked, then, how can the sea water under such circumstances be possibly kept in a healthy state? Why, thus: by exposing a very extended surface of it to the action of the air, and at the same time limiting its depth. The means that I have been adopting for upwards of twelve months consist in the employment of shallow circular stone-ware pans of about eighteen inches internal diameter by five inches deep; these are filled for about two inches with water, the bottom is supplied with sand and shingle, and numerous fragments of rock-work are arranged at the sides, some close below the surface of the water, others rising in gentle slopes above, and others again grouped to form cavities of retreat, so as to accord with the habits of the crabs, blennies, &c., placed in them. The whole is covered with a sheet of common window-glass, raised about one-fourth of an inch from the edges of the pan by means of slips of wood, so as to allow a free current of air over the surface of the water, and at the same time impede the evaporation and prevent the greater part of the dust and soot from settling on it. By this arrangement a very extended surface of water is submitted to the oxidizing influence of the air, and the fish and crabs, by their continual movements, cause sufficient motion in the fluid to expose a fresh surface frequently to its action, and thus keep up its aëration. But it must be borne in mind, that the oxygenation of the water thus effected is a very delicate equilibrium, and the maintenance of a healthy aëration is liable to be disturbed by very slight interfering causes; nor do I conceive that this method would be applicable except to such marine denizens as are either of such low organization as to require but little aëration of the water, or to such as the crab tribe, the blennies, cotties, gobies, and those creatures which delight in very shallow water, or which have the power of climbing out of their liquid element. The varieties I have myself kept in perfect health for the period mentioned are crabs, blennies, gobies, cotties, and varieties of Actinia. Cancer Mænas has under these circumstances cast its skin three times during the present year, having increased in its dimensions most extraordinarily each time.

Memorandum 3.—The form of aquarium which, after upwards of five years' experience and observation on the natural habits of the various animated tenants, I have now adopted, consists in a four-sided vessel having the back gradually sloping upwards from the bottom at an angle of 45 to 50 degrees, and the consequently extended top sloping slightly downwards and resting on the upper part of the back. The bottom, therefore, becomes necessarily narrow. The front for the purposes of observation, and the top for the admission of light, are to be of glass; the back, ends and bottom being constructed of slate; the whole fixed in a stout framework.

The advantages of this arrangement are:—

First. That it allows of a most extended view of the whole interior of the aquarium.

Secondly. That it enables the occupants to resort to water of any depth they may desire, or even to ascend the sloping back and emerge from the water.

Thirdly. It admits of a much larger surface of water being exposed to the action of the light; and

Fourthly. The sloping top allows the water which condenses on the glass, from the effect of radiation, to trickle off and return to the aquarium without first resting on the zinc or iron frame-work.

I need hardly mention that the sloping back is to be covered with light rock-work extending to a short distance above the water-line.

ROBERT WARINGTON.

List of Land and Fresh Mollusca found in the neighbourhood of Banbury, Oxfordshire. By RICHARD STRETCH, Esq.

THE nomenclature of this list is that of Gray's 'Turton's Manual.'

Neritina fluviatilis. Not uncommon in the Cherwell, but small. I collected about two dozen specimens in a few minutes. Turton (page 33) limits this species to the southern part of the island; but I have found it at York, along with Planorbis corneus and Cyclas rivicola, which he states are not found further north than Nottinghamshire.

Paludina achatina. Abundant in the Cherwell and the Oxford Canal.

Bithinia tentaculata. Common in most of our streams.

„ ventricosa. The Cherwell.

Valvata piscinalis. Abundant in the Cherwell.

„ cristata. Rare. The moat at Broughton Castle.

Arion ater. Very abundant.

" hortensis. A few specimens in the same localities as Limax agrestis.

Limax maximus. Not uncommon in damp situations.

„ flavus. Rather common in the cellars here. They are difficult to find, as they do not come out of their hiding-places till about midnight. I found one specimen which was infested with a colony of white lice, which ran swiftly about its body without any seeming inconvenience.*

„ agrestis. Very abundant.

Vitrina pellucida. Common in moist herbage at the bottom of hedges.

Helix aspersa. Common everywhere.

„ hortensis. Not uncommon along with H. nemoralis.

„ hybrida. A few specimens in a small wood, with hundreds of H. nemoralis.

„ nemoralis. Very common.

„ Pomatia. I have not found this species nearer than Charlbury Forest, where it is abundant.

„ arbustorum. Common, but local; feeding on the rank herbage in damp ditches.

„ lapicida. Not uncommon amongst loose stones at Charlbury.

„ pulchella. Common in moss and under stones. I have found the variety imbricata in dry situations, as mentioned by C. Ashford in his list of shells found at Ackworth (Zool. 4262).

„ fulva. Not unfrequent in damp woods.

„ aculeata. Amongst decaying vegetable matter at the bottom of hedges.

„ hispida. Common under stones.

„ rufescens. Common in the hedge opposite the Union.

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* This circumstance is of frequent, if not constant, occurrence.—Ed.

Helix concinna. Found along with H. rufescens.

„ virgata. Very common, feeding on the scanty herbage of the limestone rocks.

„ caperata. Five or six specimens on a mud wall at Hanwell.

„ ericetorum. Hill-side near Wiggington Heath.

Zonites rotundatus. Common under stones.

„ umbilicatus. Common in the limestone walls at Edge Hill and Chipping Norton.

„ pygmæus. Pretty common in damp grass.

„ cellarius. Common under stones.

„ allianus. Ditto.

„ purus. Frequent in damp ditches and woods.

„ nitidulus. Common under stones.

„ radiatulus. Occasional.

„ crystallinus. Rather common along with Z. purus.

Succinea putris. Found in marshy situations, but not so plentiful as S. Pfeifferi.

„ Pfeifferi. Common in marshy ditches and osier-beds.

Bulimus obscurus. A few specimens at the roots of trees.

Zua lubrica. Common in gardens and woods.

Achatina acicula. A few dead specimens from a dry bank at Broughton.

Pupa umbilicata. Common beneath moss and at the roots of grass.

„ marginata. A few specimens from Rainsbro' Camp.

Vertigo pygmæa. Beneath the moss on the old wall of Rainsbro' Camp.

„ pusilla. Same locality as V. pygmæa.

Balea perversa. Not uncommon on old walls at Sibford and Astrup.

Clausilia bidens. Not rare in the woods at Edge Hill.

„ nigricans. Very abundant in woods.

Carychium minimum. Common at the roots of mossy grass.

Limnæus auricularis. Some fine specimens from the canal and river.

„ pereger. Very common, as also is the var. lineatus.

„ stagnalis. Common in the river Cherwell.

„ palustris. Very abundant in the Oxford Canal.

„ truncatulus. Not uncommon along with L. palustris.

Ancylus fluviatilis. Common in running streams, but small and difficult to find, being generally covered with a greenish incrustation.

Velletia lacustris. Not uncommon under the leaves of plants in the Cherwell.

Physa fontinalis. In the Cherwell.

Planorbis corneus. Not uncommon in the river.

„ lævis. Moat at Broughton Castle.

„ marginatus. Very common.

„ vortex. Common in small ponds and ditches.

„ spirorbis. Ditto.

„ nitidus. Rare.

„ contortus. A few specimens of this species have occurred.

Cyclas rivicola. Very common in the Cherwell.

„ cornea. Common in the river.

„ calyculata. In a large pond at Hanwell.

Pisidium nitidum. Ditto.

„ Henslovianum. Two or three specimens from the moat at Broughton.

„ amnicum. Common in the river and along with P. nitidum.

„ cinereum. A large pond at Hanwell.

Anodon cygneus. Very abundant; the varieties are so numerous that I cannot say with certainty which are found in this neighbourhood.

Unio pictorum. Not uncommon in the Cherwell.

Dreissina polymorpha. The sides of the canal for some distance are lined with multitudes of this species of all sizes: the large specimens are much corroded at the umbones.

In conclusion, I will just mention a method of representing the animals of Mollusca generally, which is peculiarly applicable to the genera Arion, Limax, and others which have either a very small shell or none at all. I have seen it carried out to some extent in the cabinet of a friend of mine in this town, and the effect is extremely good. He models the animal in a paste made of new white bread, worked between the fingers to such a consistency that it is easily moulded without cracking, and when it is nearly dry he paints it the natural colour, and varnishes it over. The semitransparency of the body is beautifully imitated by this method if the paste is kept clean.

RICHARD STRETCH.

Parsons Street, Banbury,
November 18, 1854.

On the Introduction of Forms of Animal and Vegetable Life into New Localities. By Alfred Merle Norman, Esq.

Times are changed. No longer is the student of the works of the Creation looked upon as half-witted, or despised as one who trifles away his time in an idle and useless pursuit. Each day is adding to the number of our naturalists. The time when the study of Nature was centred in the few is gone, we trust, never to return; and some acquaintance with the leading features of Natural History is considered at the present day to be almost a necessary part of education.

Many have been the causes which have conduced to this most encouraging state of things. Zoological and Botanical Gardens, Museums, Ward's cases, and glass tanks, have brought many of the most beautiful productions of the animal and vegetable kingdoms before the eyes of hundreds, who would otherwise have been ignorant of the existence of such gems. They have looked, admired and looked again; the attention at length becomes fixed, and what was at first a mere idle gaze ripens into one of interest, and ends in enthusiasm. I have known many such instances, more especially resulting from admiration of the rich and endless variety of form and colouring displayed by the prisoners in Marine Vivaria.

Another cause of the impulse which the study of Natural History has of late received, has been the establishment of Natural History Societies throughout the country; and although the meetings of many such societies consist for the most part of persons who come to see their friends, and not from any real regard to the objects of the meeting, yet still they cannot listen to the lectures, usually delivered on such occasions, without receiving some instruction; and their being present at any rate tends to make Natural History *fashionable*. Many of these societies, moreover, have already done much real scientific good in adding not a little, by means of carefully prepared local Faunas and Floras, to our knowledge of the geographical distribution of animals and plants.

The microscope has been a third and most invaluable incentive to many to look more closely into the works of Nature; and while it has revealed to the astonished student the fact that each drop of water is in itself a world, the telescope has shown the world itself to be a mere drop of water as compared with the vastness of Creation.

But much of encouragement as we may see in the enlistment which is so rapidly taking place, from these combined causes, in the ranks of science, and rejoice as we may over each recruit that is added to our staff of working naturalists, whether in field or barracks, we must nevertheless all look most carefully and cautiously, lest, instead of forming our troops into a firm phalanx, we fall foul of each other, and thus endanger the safety of our "Natural Defences."

The dangers referred to are many in number; but there is one to which I would wish in particular to call attention, as being of rapid growth in the present day, and to which the more scientific mode of studying Natural History now adopted has in a great measure contributed.

An acquaintance with the mere form of any natural object was formerly deemed sufficient, and Natural History was pursued for the sake of simply naming a collection of objects which would look pretty in a cabinet. Under these circumstances the mere descriptions of outward forms were all that were required; and but few entered upon scientific investigations of those classes of animals which they studied. Natural History has now soared above this degrading state of things, and every fact is esteemed as important which will in any way tend to elucidate any portion of the history of particular species; the minutest details of habit and food, growth and development, habits and economy, as well as of anatomy, external and internal, are considered of value, and to be worthy objects of the most searching investigations.

In order that they may forward these views, many lovers of Nature, when they have met with some rarity in another district, are not content with procuring specimens at the time, from a wish to possess so great a prize in their immediate neighbourhood, or for the still more natural and justifiable cause, that they may examine and watch the development of their protégés, but are in the habit of transporting animals and plants from one district to another. But although the watching of the success that attends such trials may be highly interesting to the individual making the experiments, and the changes which result from difference of climate, soil, or food, in specimens of the animal or vegetable kingdoms, may be highly instructive to all, still such experiments as are now referred to should not be made without certain precautions having been adopted, lest, while in minor points the experiment be instructive and of value, in major ones it prove detrimental to the last degree. If every naturalist were to introduce exotic forms of life into this country, or carry animals and plants from one part of Great Britain to another, science would suffer one of the severest blows that could be dealt at it. Our previously conceived ideas of geographical distribution would be subverted, and, in the inextricable confusion that would ensue, naturalists of the present time would hereafter receive but sorry justice, and would be thought to have overlooked many objects which our descendants had through their greater assiduity discovered; while naturalists of future years would find themselves entangled in a very Penelope's web in the vain attempt to unravel the knot we had tied, and to separate truly indigenous species from those that had been introduced.

I would earnestly beg, therefore, that any one who shall hereafter introduce any form of animal or vegetable life into a new locality, or may have already done so, will make known the same through the medium of the 'Zoologist,' or any other such like publication, to his brother naturalists of the present and future times; and I trust that my namesake, Mr. G. Norman, will have the kindness to send the names of the Mollusca he has succeeded in naturalising in the North of England (Zool. 4435) for insertion, and thus set an example, which I hope all, under the same circumstances, will follow.

There is little doubt but that many forms of exotic animal life would as easily become acclimatised in this country as do those of the vegetable kingdom; but whether it is desirable thus to introduce them is a matter on which there is a great diversity of opinion. All I wish now to enforce is the great importance of *making known, in the most public manner possible, every instance of foreign importation into this country, or into any particular neighbourhood.* It would take up too much of your space were I to enumerate the many uncertainties that have arisen, with regard to the ascertaining of true natives, from the neglect of this most important measure in past times. Many such will occur to your readers in almost any branch of Natural History in which they may be interested.

ALFRED MERLE NORMAN.

Isle of Cumbrae, N. B.
Sept. 10, 1854.

Ravages of Caterpillars. By the REV. ARTHUR HUSSEY, M.A.

FOR the last two summers many of the gardens in this village have been infested by caterpillars to such an extent, that the cabbages have been *utterly* destroyed. When fully fed, the vermin, as usual, crawled away in search of a spot where to undergo their next change, at which period the ridges of the surrounding walls presented a curious appearance, being occupied by a continuous string of the creatures, generally travelling in the same direction. Last year a favourite goal was the roof of a large house, near which an immense host had been bred, and the walls, being white, rendered very conspicuous the unbroken dark line of the insects, which for some time persevered in swarming up it, and which not merely entered the rooms, but crept into the beds, among clothes, or into any other place of concealment, the only remedy for the nuisance being to keep the windows closed. Though the owner of the premises employed a number of boys, his scholars, in sweeping with brooms the walls leading to the house, their exertions produced no visible effect; consequently they were soon relinquished. A band of melted tar was next drawn under the coping of the wall on the side whence the hostile hosts proceeded, but to no good purpose, for when the vermin reached the tar, they simply followed it to the extremity of the wall, where it ceased, and then resumed their former course. The rate, too, at which these little animals advance, is far more rapid than would be imagined, though some attention will prove that their motions are really quick, their sole object during the journey appearing to be to "move on."

A large proportion of the caterpillars of 1853 took refuge in a malthouse, from which they could not escape as butterflies, the result being that for several weeks during the past spring and summer the maltster swept up *daily many hundreds* (700 or 800! I was informed) of the dead insects. Notwithstanding, though rather less numerous than in 1853, they abounded quite sufficiently this year to cause the annoyance and loss alluded to above, especially as they arrived in successive swarms: if the garden had been completely cleared of them, a fresh army was speedily to be perceived as busily engaged as its predecessor.

The 'Zoologist' for 1846 records (Zool. 1442, 1443) the immigration about Dover from the Continent of an immense flight of white butterflies, in the beginning of July in the same year, and the pest, from whatever cause it might proceed, certainly extended to this place, the cabbages that season, partially if not generally, having been entirely devoured. I then noticed for the first time the operation of the ichneumon flies, the effect being that few or none of the caterpillars were observed by me in the chrysalis state, and that in 1847 the gardens were, if I recollect rightly, free from the ravages of the preceding year. My experience on that occasion induced me to watch the course of events last autumn, but, though the ichneumons were neither entirely absent nor yet inactive, the proportion of their victims to those which escaped seemed very small indeed. During this season, however, the number of "fly blown" caterpillars must, I conceive, have been ten times that of 1853, even although the aggregate amount of both sound and unsound may have been less; from which circumstance I am disposed to anticipate the great mitigation, if not the total cessation, of the plague in 1855.

Among countless nests of ichneumons already changed to the chrysalis state, I searched long before I could discover an example of the little maggots in the act of emerging from the body of the caterpillar, but eventually succeeded very fully. By that time the caterpillar is in a torpid condition (but not dead, since it moves if touched), remaining quite still while the parasites gradually extricate themselves with a wriggling motion, sometimes in such a quantity that it is impossible to count, without removing, them. I have seen a mass which I should estimate at two dozen at least. Their next change must occur very rapidly, for in one instance I examined a brood, of which only one was distinctly visible, and that was busily engaged in spinning the silky web wherein it was to be enveloped. On my return, in about twenty minutes, I looked again, when the little creature had completely concealed itself. A very large proportion of the ichneumon-cases have now for some time been empty, but what may be the general rule with regard to the perfect insect coming forth must be left to entomologists. The flies I have seen were very small.

In the first volume of the 'Zoologist' (Zool. 326), I have related some illustrations I had noticed of the prevalence and sudden disappearance of certain insects, which disappearance, in one case, I was able to trace to its probable cause. The phenomena now described are of the same class, being among the innumerable proofs we possess of the care wherewith a wise and beneficent Providence maintains "the balance of power" in its creation; and showing that, although vermin of various degrees and kinds are occasionally sent in vast multitudes for our chastisement or our trial, provision is also mercifully made for the alleviation and final removal of the infliction.

In the course of the observations detailed above I remarked a few particulars, which may be appended to this account. Among the victims of the ichneumon flies I have not known one *green* caterpillar, though they are sometimes offensively plentiful upon the cabbage tribe. They may suffer, but I have never seen any which had done so: perhaps they protect themselves by their habit of penetrating very deeply into the plant, besides that their colour renders them less conspicuous than others. Neither am I aware that the number of the green caterpillar ever approaches *nearly* to that of the variegated kind, as during the last two seasons. The latter insect, when uninjured, seems to me to undergo its change, if upon a plain surface, in a perpendicular position, with the head uppermost. Frequently, however, it selects a depression in the face of a wall, or fixes itself under the coping bricks, or in some similar spot, when its position is necessarily varied according to the situation, but I have *never*, I believe, found a chrysalis *reversed.* When the insect has become merely a case for the parasites, it makes the final pause in any direction, as often as not perhaps with the head downwards. Among the myriads which wander in search of a resting-place, not one perhaps of the sound, and very rarely one of the unsound, caterpillars will stop upon a wall exposed to the south or south-west, that is, to the winds from the sea. A favourite locality is a line of wall facing eastward, and open throughout to the north-east; consequently they can have no instinctive apprehension of the effects of frost, contrary to the common and groundless notion of that being generally fatal to insect life.

Experience has suggested to a neighbour and friend, who has been much pestered with the creatures, that probably a very durable green dye might be obtained from the bodies of cabbage-fed caterpillars. Years of washing have not effaced the stain of one accidentally crushed upon linen, nor will water remove such marks from a brick pavement.

ARTHUR HUSSEY.

Rottingdean, November 10, 1854.

Proceedings of Natural-History Collectors in Foreign Countries.

MR. H. W. BATES.*—Santarem, March 27, 1854.—Although I cannot get ready a collection by this month's steamer, I think it well to write, and chiefly to let you know of the safe arrival, a fortnight ago, of the box of books and packet of letters forwarded by you on the 26th of December last. I cannot give you an idea of the pleasure it caused me to receive so many cheering, valuable, and useful books and letters, especially as a long time had passed since hearing from you, and I had began to feel disconsolate. The seven vols. of 'Suites á Buffon' I very much needed, especially the Hymenoptera part, and henceforward you may depend upon it the bees, ants, &c., will feel the effect, and I hope many curious notes of habits can be prepared for the 'Transactions.' You did quite right to send me the two vols. of Jardin des Plantes Catalogues. These catalogues are very necessary, as the best books we can get only describe a small portion of the subjects, which deficiency the catalogues supply, and thus a complete guide to collecting is made up between them. The last time I wrote (January last) I informed you of the safe arrival of not only the box of books you sent in May, 1853, but also the long-lost parcel of May, 1852, so that up to the present time not a single article or letter you have advised me as forwarded per Singlehurst & Co. is missing. I have not had such good fortune with the 'Illustrated News' by mail; I have not received more than half the numbers sent; therefore do not send me any more by that conveyance. As to books I am quite set up in all the orders of insects, and do not require anything now except first-rate Monographs, as they appear, such as what I ordered of you, Lacordaire's 'Phytophages,' and also such as F. Smith's Monograph of Cryptocerus, and Catalogues of British Museum and Jardin des Plantes, as they appear. They at present seem to be working on different families and orders: of course, when the London and Paris Catalogues are on the same group, it is not necessary to send both. Chemnitz you can continue to send as it appears. In my January letter I ordered a few British Museum Catalogues, amongst them Part 1, Hemiptera; but, however, all the Zoological Catalogues (except those on British Fauna only) from this day forward would be useful to me, and you can send me them by degrees. Please thank Messrs. Hanbury, Janson and Baly for their notes and letters: to Mr. F. Smith I will write, if there be time, before post closes. To Mr. Hanbury please say I never lose an opportunity of acquiring objects in his department. The difficulty is not in collecting together plenty of different kinds of balsams, resins, or medical roots and barks (really so or only reported), the real difficulty is in identifying these separate objects with the tree which produces them, and acquiring a flowering specimen of it. This is much aggravated by the loose terminology of the Indians, who give the same name to very different things. The same applies to useful woods, but still by degrees I am getting a correct knowledge of these things. To Mr. Baly please say that I will bear him particularly in mind in collecting the ants and bees: of the Œcodema, since I have received his note, I have found two species quite different from the true cephalotes, and I think it likely I may add immensely to the number of species of ants. The Eulaima I now know very well, and shall procure males and females of every species. One species, I believe, makes its nest in wood: the Mesopliæ and Mesocheiræ of St. F. are very likely parasites on them. In the cyclicous Coleoptera I will also bear him in mind: it was a favourite group with me last year, as I drew up a careful analytical description of all the generic forms—a mass of manuscript, with brief characters of about 400 species: although they are the only Coleoptera here one may call abundant in individuals, many of them (especially the Megalopi and Megaceles) require a long time to get a tolerable set of. Mr. Wallace, I suppose, will be off ere this, therefore next month will do to reply to his kind letter. I hope somebody will send me a copy of his other book, the Voyage. The Palms I have now two copies of, and it is really a very correct, useful book on the class. I can add many species, however, to his list, and I doubt not Mr. Spruce could double it. It is curious that two months before receiving your last letter I had been attending to the Termites. I began first to look for M. Schiödte's new Staphylini and ended by becoming greatly interested in the Termites, without, however, finding the Staphylini. Some of the results of my examination up to the present date I intend to send you on separate sheets. The specimens will follow next month. I have examined about 100 colonies: some of the results I have come to are, that there are no truly apterous imagos; that there are only two kinds of larvæ, fighters and workers; that a large hillock is always an agglomeration of many very distinct species which build with very different materials; that some species cherish only one female and one male adult in a colony, whilst others have a great number, 50 or 100 adults, the male and female in about equal numbers. Lastly, I have detected a very good character to distinguish male and female in the pupa and adult states. I have found pupæ in various stages of growth or ecdysis, without, however, as yet, detecting the first moult from the larva to the pupa, to decide what becomes of the monstrous apophyses of the head and the mandibles of the soldier (fighter) larva. My remaining collections I will send next month, just before I leave for the Upper Amazons, which I expect will be early in May. The Cattleya, &c., I will look for when I get to a good place for them. I understand the business, I think, quite sufficiently. You make me very envious in only speaking of the Morpho Cypris, &c., of

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* Communicated by Mr. S. Stevens.

Bogotà. I wonder how they are captured, if they are like M. Adonis and Hecuba here: about five miles from Santarem these two Morphos and a third very red and orange in colour appeared for a few days at the beginning of the wet season, but they would never descend lower than from 30 to 40 feet. I watched them for hours, until I nearly dislocated my neck with looking up at them. The one Adonis I sent from Parà, for my private collection was caught by a lad I employed, by climbing a tree.

Santarem, April 27, 1854.—By the steamer this month I send a cedar-wood chest containing six boxes of insects, a few specimens of economic Botany, and miscellanies. The insects to be placed with my stock of private collection are those things which I find it most difficult to preserve in this climate; and by degrees I see I shall have to send the whole of my private collections of other families, which become mouldy here more readily than the others. The collection for sale contains a large lot of ants, with many notes for Mr. F. Smith, a letter, and a collection of Termites, which I have had great trouble to keep from Acari and mould, many having been destroyed: my notes on these I consider important, containing several discoveries I have made on their habits. The notes might be published in the 'Trans. Ent. Soc.'; if you would get the species drawn, described, and named, they would form a splendid paper; in fact, I flatter myself, would attract much the attention of naturalists. The phial with Termites in spirits is in a tin box in the parcel: there is also a specimen of a species of Orchis (lilac-coloured, but not a Cattleya I think); just show it and ask if good; I am growing one part of it on a tree in my garden. I wrote you last month acknowledging the receipt of your most welcome parcel of letters and box of books, which, up to this date, has been to me a continued intellectual feast, and given me lots of occupation. In the account of the insects I send you now, I have kept the ants and Termites as separate items; I want to see how they sell; the British Museum, I think, should have the Termites, if they arrive in good condition; with the notes I send they become of value. Please to thank Mr. Hanbury on my part for the present of the pamphlets and the hints contained in his two notes. I scarcely expect to find any of the different kinds of balsams of Peru in the Valley of the Amazons, except it is near the eastern foot of the Cordilleras. The present collection I have taken great care to keep free from mould. The ants and other Hymenoptera are pinned and dried so carefully that I am sure they will be valued as specimens, if the moisture does not collect on them. I find the Diptera and Orthoptera most difficult to keep, and am afraid I shall be obliged to send them all to be kept in London, and therefore lose the pleasure and advantage of having them at hand to study. What I now send of the private collection I have made memoranda of, so as to know pretty well when I meet with a fresh species in future. I cannot yet send you a collection of showy Diurnes, as you request; there are none at Santarem except the very common, as C. Dido, the common Agraules, Callidryas, &c. I have never seen an Epicalia Ancea here, nor any of the handsome Parà Papilios, except now and then a Sesostris. At Ega I could get you up a glorious collection of 1000 to 2000, and I am hourly expecting the Nanta steamer down, when I shall bargain with the captain to take me up here on his return (I suppose it will be considered a favour, besides costing £15 or £20 passage money).

H. W. Bates.

Entomological Botany (with more especial reference to the Plants frequented by the Tineina). By H. T. Stainton, Esq.

(Continued from page 4472).

Stellaria Holostea. Greater Stitchwort.

Common in hedges, frequently growing in considerable masses, and when in flower "its brilliant white starry blossoms render it very conspicuous." The association of ideas with this plant is pleasant; we think of it in connection with the lengthening evenings at the end of April, when everything is bursting into leaf, and the cuckoo's song is first heard. I remember, when a child, I was told the plant was "Cuckoo's Bread and Cheese," but I have not observed this given as a synonym in any botanical work. As early as January we may find the larva of Gelechia tricolorella mining the leaves of this plant, and at a later period (March and April) screwing up the terminal shoots and feeding therein. (See 'Transactions of the Entomological Society,' vol. ii. New Series, plate x. fig. 1). In April the leaves are mined by the larva of Gelechia maculea, which at the end of May may be found in the capsules feeding on the seeds. (See 'Transactions of the

Entomological Society, vol. ii. New Series, plate x. fig. 2). At the end of April and in May the larvæ of Coleophora solitariella may be noticed in their pale whitish cases attached to the under side of the leaves, in which they make pearly white blotches, by devouring the parenchyma. (See 'Transactions of the Entomological Society,' vol. ii. New Series, plate xi. fig. 3). The young larvæ of this last species may be met with feeding in October and November.

Stellaria uliginosa. Bog Stitchwort.

A common but rather insignificant plant, frequenting moist places, and growing almost concealed among the ranker herbage; in the early spring (March and April), when the smooth shining leaves are just making their appearance, the small shoots are noticed to be distorted into various uncouth shapes: this apparent malformation is caused by the presence of a brown larva which feeds in the heart of the young shoots; it is the larva of Gelechia fraternella. (See 'Transactions of the Entomological Society,' vol. ii. New Series, pl. x. f. 3.)

Cerastium glomeratum (vulgatum). Broad-leaved Mouse-ear Chickweed.

The larva of Gelechia fraternella, though most partial to the preceding plant, may occasionally be found in the shoots of this, and the larva of Coleophora solitariella has also been observed feeding on this.

Malva moschata. Musk Mallow.
Malva sylvestris. Common Mallow.
Malva rotundifolia. Dwarf Mallow.

No Tineina larva is known to feed on any of these plants, though the two last are almost universally distributed: when we bear in mind how the larva of Gelechia malvella feeds in the seeds of the allied Althæa rosea, the Hollyhock of our gardens, it is difficult to imagine that the seeds of our wild mallows, or "cheeses," as they are called by children, are not to the taste of any of the numerous larvæ of Gelechiæ which are still unknown to us.

Althæa officinalis. Marsh Mallow.

Speyer gives this as a food-plant of Eubolia cervinata; however, the larva of that species is more accessible on the Hollyhocks, which grow nearer home than "marshes, particularly near the sea," which Babington gives as the habitat of this plant. I am not aware that the Althæa officinalis has ever been examined by any Micro-Lepidopterist.

Tilia europœa. Lime Tree.

The list of Micro-Lepidoptera feeding on this tree or its congeners (*parvifolia* and *grandifolia* which, for entomological purposes, do not claim a distinct notice) is rather formidable. Speyer gives the following:—Smerinthus Tiliæ, Aglia Tau, Endromis versicolora, Stauropus Fagi, Petasia cassinea, Notodonta camelina, Platypteryx sicula, Cossus ligniperda, Zeuzera Æsculi (the two last feeding *in the wood*), Hypogymna dispar, Leucoma Vau-nigrum, Dasychira pudibunda, Pygæra bucephala (which sometimes actually defoliates the trees prematurely), Gastropacha Pruni, Pæcilocampa Populi, Eriogaster lanestris, Acronycta Psi, Amphipyra pyramidea, Miselia Aprilina, Orthosia instabilis, O. stabilis, Xanthia Citrago, Cosmia trapezina, Hibernia defoliaria, Nyssia hispidaria, Biston hirtarius, Odoptera Alniaria, O. erosaria, O. angularia, Ourapteryx Sambucaria, Eurymene dolabraria, Harpalyce Corylata, Euthalia psittacata, and two of the Micro-Lepidoptera, Tortrix Ribeana and Rosana.

The Tineina larvæ feeding on the lime are few in number; Mme. Lienig found on it the larva of Cerostoma sequella in May; she also states that the larva of Röslerstammia Erxlebella feeds on the lime in May and September, on the under side of the leaves, in which it makes large round holes; but, as I have elsewhere stated, I suspect there must be some mistake here; the larva of Coleophora anatipennella (the Tiliella of Schrank) sometimes feeds on this tree in May; and in winter and spring the larva of Chrysoclista Linneella feeds on the inner bark: this species, which is so excessively abundant around London, is a rarity in many localities, and is nowhere common on the Continent. The larva of Bucculatrix Hippocastanella feeds on the leaves of the lime in June and August; probably when young it mines the leaves, but on this point we are yet uninformed. It is singular that no larva of Lithocolletis or Nepticula has hitherto been observed on this tree.

Hypericum perforatum. Common Perforated St. John's Wort.

The larva of Cloantha perspicillaris (of which only one British specimen is known) feeds in July and August on this plant; the larvæ of the allied species C. radiosa and Hyperici (which have never been detected here) also feed on it in June and July. Speyer also gives the larva of Anaitis plagiata as feeding on it. The larva of Catoptria Hypericana feeds in the shoots in May, and in the seeds in July; and at the end of May and beginning of June the larva of Depressaria Hypericella may generally be met with in the screwed-up heads of the plant, unless the contortion has been caused by that polyphagous nuisance to the collector Sciaphila subjectana: the larva of Gracilaria auroguttella mines the leaves when very young, making a slight pucker longitudinally, and afterwards constructs a neat cone of the leaf (see 'Transactions of the Entomological Society,' vol. ii. n. s. pl. xiv. f. 3), which, at first green, speedily turns dirty yellow, from the epidermis and half of the parenchyma being taken away from the inside of the cone; the cones are then very conspicuous, and may readily be noticed in July and September: when the larva is full fed it quits the cone, and twists up a short leaf longitudinally, making a miniature imitation of a cigar, within which it changes to a pupa: these cigars are at first quite green, but turn to a dirty greenish brown colour; they may be noticed at the end of July and during winter. The larva of Cemiostoma lustratella is stated to feed on this plant; but though no doubt it occurs here, it has not hitherto been detected as British. In September and the following months, the leaves are mined and slightly puckered by the larva of Nepticula Septembrella, which is, however, more partial to Hypericum pulchrum.

Hypericum hirsutum. Hairy St. John's Wort.

The larvæ of Catoptria Hypericana and Depressaria Hypericella also feed readily on this plant.

Hypericum pulchrum. Small Upright St. John's Wort.

The principal food-plant of Nepticula Septembrella, the larva of which I have observed feeding in the glossy little leaves as late as December; the delicate little patterns which it traces in these leaves are quite in harmony with the general neat appearance of the plant.

Acer campestre. Maple.

The food-plant of two of our rare prominents, Lophopteryx cucullina and Ptilophora plumigera, both of which have lately been met with on the chalk in Buckinghamshire, though on the same strata South of London they have not been observed. Speyer also enumerates Pygæra bucephala, Xanthia sulfurago, Cosmia trapezina, Anisopteryx Aceraria (a species exceedingly likely to occur in the South of England) and

Ephyra omicronaria. The larva of Dictyopteryx Förskaliana is excessively abundant on this plant at the end of June, and the pupa may be conveniently collected in the leaves which have a corner turned down very closely. The active larva of Gelechia scriptella may be found in September doubling the leaves nearly in half, and tying the sides together by some strong silken cables. In July and in October the leaves are apt to have a slight distortion at the edges, caused by the larvæ of Lithocolletis sylvella, which establishes its puckered mine on the under side of the leaf. No larva, either of a Coleophora or a Nepticula, has yet been observed on the maple. The seeds, or "keys" as they are sometimes called, merit attention, as probably they will be found to afford nourishment to more than one species of insect: I once found a Lepidopterous larva in one.

Acer Pseudo-platanus. Sycamore.

The larva of Acronycta Aceris, one of the most beautiful we have, frequents this tree, though also partial to the horse-chestnut; Speyer also enumerates the larvæ of Odoptera lunaria, O. illunaria, O. illustraria, Ptycholoma Lecheana, and Gracilaria rufipennella; the larva of the last-named species forms cones on the leaves (similar to those of G. stigmatella on sallows and willows) in the month of June.

Æsculus hippocastanum. Horse-Chestnut.

Though not an indigenous tree, I am obliged to mention it here, it being too important entomologically to be overlooked; the wood is eaten by the larva of Zeuzera Æsculi, and the leaves by the larva of Acronycta Aceris and Anisopteryx Æscularia. The larva of Bucculatrix Hippocastanella should be found on the leaves in June and at the end of August, and this is the only Tineina larva at present known to frequent this stately tree.

H. T. Stainton.

Mountsfield, Lewisham,
January, 1855.

(To be continued).

Professor Bailey's mode of giving Permanent Flexibility to Natural-History Specimens.—The mode of application which I have employed is to immerse the dry specimen for some time in a neutral saturated solution of chloride of calcium, which any one can make for himself, by saturating hydrochloric acid with marble, and then, after the specimen has become sufficiently softened to bend easily, remove it, and let it drain in the open air. In some cases, where the specimens do not imbibe the salt readily, it is well to soften them in warm water before immersion in the salt. A speedy impregnation will then take place, after which the specimens, if plants, may be subjected to moderate pressure in the usual way, and restored to the herbarium, while other specimens may be kept on shelves, or in any way usually employed for similar objects, and all will, for any length of time, retain sufficient moisture to prevent brittleness. The salt being neutral, no fear need be apprehended of its injuring colour or texture, while its antiseptic properties will aid in the preservation of matters liable to decay.—*From 'Silliman's Journal.'*

Rare Birds killed near Scarborough.—The following rare birds have lately been killed in our neighbourhood:—one red-necked phalarope, fourteen gray phalaropes, five stormy petrels, four little auks, four purple-backed sandpipers, one red-throated diver (mature), one female goosander. On the 25th of November, a noble female specimen of the gyr-falcon was shot near Robin Hood's Bay, on the moors of Sir John Johnstone, M.P.: the bird is in the finest adult plumage: beak pale blue; cere wax-yellow; irides black; head, neck, breast and lower part of body white: upper parts are white, sparingly marked with arrow streaks of black pointing downwards: the tail has no bars, but is white; legs yellow; talons brown: the crop was overloaded with the entrails of some animal, most probably a hare; the stomach with the feathers of grouse and portions of the grouse. The length of this majestic bird, from the point of the beak to the end of the tail, was 20¾ inches; full extent of wings when opened, 3 feet 10 inches; weight, 3 lbs. 3 oz. Sir John Johnstone has forwarded the bird to me to be preserved.—*Alfred Roberts; King Street, Scarborough, December* 1, 1854.

Occurrence of the Short-toed Lark (Alauda brachydactyla) *and of the Lapland Bunting* (Emberiza Lapponica) *in Sussex.*—Mr. Swaysland, of Brighton, the fortunate captor, as recorded in the 'Zoologist' for this month, of the Sylvia galactotes (? galactodes), possesses a short-toed lark and a Lapland bunting, both which were caught in lark nets in the neighbourhood of Brighton, and were kept alive for a time.—*Arthur Hussey; Rottingdean, November*, 1854.

Note on the congregation of Swallows.—About the 14th of last August I noticed a number of swallows to roost every evening in a small willow plantation, in this parish. This number gradually increased, until about the middle of September, when they amounted to thousands—I was going to say myriads. To see their movements about roosting-time was one of the most pleasing sights which I have ever witnessed amongst the feathered tribes. About six o'clock every evening, several hundreds of birds, apparently those bred in the parish, collected together at a particular part of the air, and amused themselves by twittering and hawking after flies. In a short time another body of swallows would arrive, evidently from another locality, and their arrival was announced by a burst of twittering from both parties: then arrived another from an opposite direction; the same actions were repeated, and it joined the main body. In this manner the original flock was augmented, apparently from all points of the compass, and it gradually swelled into a tremendous flight, which kept up such a loud, continued twitter, as to arrest the attention of the most inattentive. As I sat and watched the birds assembling, with unwearied delight, I have often been struck with astonishment at their amazing multitudes; for their numbers seemed really sufficient to people every town and hamlet in England. To watch them retire to roost was a singular spectacle: they collected over the willow-bed, circled round and round at a great height above it for some time, then down came a hundred or two into the middle of the willows, like a shower of large black soot-flakes, the main flock continuing to circle round and round until it came immediately over the bed, when down came another shower of them, and so on, until the whole had descended. The noise which they made was precisely like that of a steam-engine when blowing off the steam; it could readily be heard at the distance of a quarter of a mile. Upon creeping cautiously up the plantation I found every twig, every leaf, bush and bit of herbage alive with birds, for they were shuffling about in order to settle down comfortably; ten or twelve would occupy one small branch scarcely two feet long. The stench arising from their droppings was very disagreeable, and the ground, strewn as it was with them, reminded one of some guano deposit upon the shores of the Pacific. To see them day by day set out in different directions, each to his appointed work—to watch them gradually congregating night by night at the same hour, and move off to roost almost to a minute—to witness the harmony which seemed to reign amongst them, their unanimity of purpose, and the completeness with which they acted, as it were, upon one organised plan, was extremely interesting, and reminded one more of an army of peaceful human beings gathered together upon some high occasion than a congregation of simple and diminutive birds. They came every evening to roost in the manner described until the 17th of September, when they departed, leaving only a few hundreds, which remained until the middle of October. I have seen the usual autumnal congregations, but never saw one upon the same immense scale before. How came they to congregate in a locality which they never had visited before in such numbers, and five or six weeks before they usually assemble in the autumn? In the 'Illustrated London News,' of November 8, I read the following remarks of the Paris correspondent, who, writing of the cholera, which had been raging fearfully in that city, said, "A singular fact has been observed, viz., that the swallows, which had entirely deserted Paris during the time that the epidemic raged, are beginning to return. To prove how much the existence of this malady influences the feathered tribes, we may state that, in the month of June, 1849, when the cholera was at its height in Paris, a flight of swallows passing over Paris, which they had previously deserted, a large number fell dead, and were picked up in the streets or floated down the river." During the period when the swallows assembled here in the multitudes which I have described, the cholera was raging fearfully in London and other large cities and towns. Is it probable that they had deserted localities where this disease was rife? Were they noticed to leave the suburbs of London during the prevalence of it? Large congregations, I know, occasionally are found in the autumn roosting upon willows upon the banks of the Thames and some other rivers. Are they ever found in immense congregations so early as the 14th of August? With us they do not flock much together until the latter end of September or beginning of October, departing, on an average, about October 20th.—*John Joseph Briggs; King's Newton, Swarkeston, Derbyshire, November* 14, 1854.

A White Swallow obtained in East Kent.—I have received information that, towards the end of October, a white swallow was killed in the neighbourhood of Sandwich, having been observed and pursued by several persons. "The head, neck and upper part of the back were a delicate silvery light brown, shading off in the under parts, tail and wings, to a not very pure white;" and the bird is stated to have "looked brilliant in the sunshine." The gentleman who shot it has sent it to Mr. Leadbitter, in London, for preservation.—*Arthur Hussey; Rottingdean, November* 10, 1854.

Occurrence of the Pigmy Curlew (Tringa subarquata) *and Little Stint* (T. minuta) *near Warrington.*—Mr. Fletcher, Curator to the Warrington Museum, shot several specimens of Tringa subarquata and T. minuta on the sands above Runcorn on the 6th ult., and more have been killed since by other parties. They are rarely met with in the river Mersey.—*Nicholas Cooke; Massey House, Penketh, November* 6, 1854.

Occurrence of the Ruff (Tringa pugnax) *at Prestwick Carr, Northumberland.*—Perhaps it may interest some of the readers of the 'Zoologist' to know that the ruff is occasionally procured so far north as Newcastle. Prestwick Carr, a tract of boggy moor, some 1100 acres in extent, and about seven miles north-west, is annually visited by immature specimens, or birds without the ruff; but this season several have been seen in full breeding-plumage; one or two of these were shot, and are now preserved in the neighbourhood.—*Thomas John Bold; Angas' Court, Bigg Market, Newcastle-on-Tyne, December* 6, 1854.

Occurrence of the Egyptian Goose (Anser Ægyptiacus) *near Newcastle.*—A fine specimen of the Egyptian goose was shot at Blaydon Flats, about three miles above Newcastle, on the 16th of November last: it is in beautiful plumage, and has the appearance of having been a wild bird.—*Id.*

Occurrence of the Lesser White-winged Gull (Larus islandicus) *near Scarborough.*—A specimen of this rare and valuable gull was obtained, under curious circumstances, on the morning of the 8th of December. I was taking the temperature of the sea from the outer pier, when I observed floating a gull which had been shot by some sportsman; at first I took it to be a young specimen of Larus canus, but, observing no black on the tip of the wings, I felt satisfied it was a rarity, and when taken out of the sea it proved to be an immature example of the lesser white-winged or glaucous gull: it is not unfrequently met with at the Shetland Islands in the winter season, but, taken on our coast, is a treasure for the ornithologist. My specimen measures in length 21 inches; the wings, when closed, reaches 2 inches longer than the tail; eyes dark brown; colour, dull white, very beautifully clouded with pale ash-brown.—*Alfred Roberts; King Street, Scarborough, December* 11, 1854.

Occurrence of Richardson's Skua (Lestris Richardsoni) *in Sussex.*—In the last week of September, during or just after a high wind, a skua gull, pronounced to be Richardson's, was picked up in a dying condition by a shepherd upon the Downs above this village.—*Arthur Hussey; Rottingdean, November* 10, 1854.

Occurrence of the Little Auk (Alca alle) *in Northumberland.*—During November, two or three specimens of the little auk have been procured in Northumberland. One of these was picked up alive, in an exhausted condition, near the village of Cramlington, which is several miles from the sea.—*Thomas John Bold; Angas' Court, Bigg Market, Newcastle-on-Tyne, December* 6, 1854.

Occurrence of Tetrodon Pennantii on the Coast of Ireland.—I have much pleasure in recording the capture of another specimen of Tetrodon Pennantii, about fourteen days since, at Ardmore, County Waterford; being washed ashore, like the individual recorded by me in 1852, than which it is somewhat smaller.—*E. H. Sargint; 26, Dengille Street, Dublin, December,* 1854.

List of Spiders found at Piercefield, near Chepstow, in 1853.—

Lycosa campestris
„ lugubris
„ saccata
„ obscura
Dolomedes mirabilis
Salticus cupreus
„ scenicus
„ coronatus
Thomisus cristatus
„ bifasciatus
„ brevipes
„ pallidus
„ incertus
„ floricolens
„ citreus
Philodromus dispar
„ cespiticolis
Clubiona erratica
„ comta
„ amarantha
„ accentuata
Ciniflo ferox
„ atrox
Tegenaria atrica
Cælotes saxatilis
Theridion nervosum
„ pulchellum
„ lineatum
Linyphia triangularis
Linyphia montana
„ pratensis
„ nebea
„ pulla
„ insignis
„ fuliginea
„ marginata
„ cauta
„ tenuis
Neriëne rubella
„ munda
„ dubia
Pachygnatha Degeerii
Epëira diadema
„ inclinata
„ antriada
„ cucurbitina
„ conica
„ callophylla
„ scalaris
„ apoclisa
„ ceropegia
„ fusca
„ albimacula
Tetragnatha extensa
Dysdera Erythrina
„ Hombergii
Segestria senoculata.

—*F. Walker; The Grove, Highgate, October*, 1854.

Inquiry respecting the name of an Australian Spider.—It will be esteemed a favour if any reader of the 'Zoologist' will mention the proper appellation of the Australian spider of which the habitation is a hole in the ground, with a moveable entrance. Of the example now before me, from the neighbourhood of Adelaide, the door is triangular, the apex being undermost, with the sides rather curved, and it is suspended by somewhat acting as hinges attached to the base of the triangle. When I first saw the specimen, soon after its arrival from the antipodes, the door opened easily, though now unfortunately it is fixed. It is impossible to ascertain of what the hinges are made and how constructed, or to describe the interior of the cell, without destroying the curiosity. The substance of the door resembles the surrounding soil, and appears to have been *cut out* of the solid surface, rather than compacted of compressed mud. If there are varieties of this insect, the generic name of the tribe can be given, though it will be impossible to identify the individual. The information requested may be either inserted in a future number of the 'Zoologist,' or forwarded by post to the *Rev. A. Hussey, Rottingdean, Brighton,* who will be thankful for attention to this inquiry.

'*Entomologists' Annual.*'—It is with much pleasure that I have read Mr. Stainton's proposal on this subject in the 'Zoologist' for October; such a publication seems to be a great desideratum; and I would venture to suggest that it is no less a desideratum that a similarly compiled record should be formed of the occurrences of *rare* species which are noted from time to time in the 'Zoologist' and other periodicals: beginners are so constantly tantalised by learning that species marked rare by our great authorities have, since their works appeared, been more generally found, though the fact be only known to those who have regularly perused the public journals. Such a record, even if it were merely to mention the names of the species, localities and captors, with a reference to the page at which they are detailed more fully, would be a great boon to the younger followers, at least, of the science, and I think it might easily be conjoined with Mr. Stainton's already determined work. To make the book extensively useful, *every* order of insects ought to be noticed in it, as the author would wish; and I sincerely hope that all entomologists will combine to assist so desirable an undertaking.—*A. R. Hogan; Charlton, Dundrum, near Dublin, October* 10, 1854.

Singular Variety of Anthocharis Cardamines.—I have a specimen of this insect, taken by a friend of mine at Hainhault Forest, which has the orange spot of the male on the under side of the right wing only; the upper side representing the perfect female.—*William Machin; 35, William Street, Globe Fields, Mile End.*

Note on Ptilophora plumigera.—Having met with a few eggs of this Bombyx on maple sprays, last winter, and bred the perfect insect from them this November, I have pleasure in communicating a few facts about its transformations. The egg occurs about here on the young shoots of the maple in hedge-rows. It is light brown, circular, and has a white ring round it, which is, in fact, the under side. It is found singly, or in twos and threes, and is pretty visible in the sunshine. The larva appears about the middle of April, or as soon as the maple bursts; at first it is hardly perceptible to the eye, being transparent and of a pale yellow colour; it soon becomes grass-green, with a dorsal stripe of darker green, bounded by two white lines: while young it is distinctly hairy. It sleeps during the day, frequently under the leaf it fed on the preceding night, and is of quiet habits and apparently social, as two often fold upon one leaf. Soon it changes its skin, and then assumes yellow rings about the shoulders, but retains the general grass-green tint and large transparent green head until ready to change: the white lines now become fainter, its habits are more active, and it feeds night and day; lastly, the tint becomes blueish, like Camelina before its change, and the dorsal stripe disappears. About the end of May or early in June, the larva buries nearly two inches below the surface, and there spins an oval cocoon, from the top of which is suspended the pupa: this is cylindrical, compressed and bifurcate at the tail. By placing the breeding-cage (in my case, a flower-pot) in the sunshine, about the middle of November, I found the perfect insect emerged from the lower end of the cocoons—in one instance escaping through the bottom of the flower-pot. Of the two varieties, the light and the dark, the latter seems rarer.—*Bernard Smith; Marlow, December*, 1854.

Occurrence of Notodonta carmelita.—It was my good fortune to take a fine specimen of this rare insect last year, and another this year, both early in May, at West Wickham. —*William Machin; 35, William Street, Globe Fields, Mile End.*

Early appearance of Cucullia umbratica.—I took this insect in beautiful condition, on the 6th April last, at Wilmington.—*Id.*

Curious Capture of Pœcilocampa Populi.—A few days ago I was agreeably surprised at finding in an old garden-shed, where I usually keep my breeding-cages, fourteen males of Pæcilocampa Populi sitting on the window and other parts of the shed, some of them rather worn, but others in beautiful condition. Not being otherwise able to account for so unusual an occurrence of an insect I have never before met with and have always regarded as rather rare, I set it down to their having been driven in for shelter in a sudden and violent storm of wind and rain that had taken place late the night before, which was previously very calm and bright: however, the next day, visiting the shed again, the night having been throughout remarkably quiet, I found in it, to my great surprise, eleven more, some sitting on what I had before considered an empty breeding-cage, but which, on close examination, I found to contain a female of the same species, apparently lately out, and in fine condition: this of course explained at once the appearance of the males. Now, though it is a well-known mode of capture of various species—of the Bombyx, &c., in particular—to expose a female in a gauze-covered cage, yet the instance I mention is remarkable, both from the number of males attracted by a single female in an out-of-the-way situation, under a north wall and at a distance from trees, and their remaining after daylight, and reposing in such a position as to be discovered and taken with the greatest ease: these facts may be useful as hints in experiments with this mode of capture in respect of the rarer Notodontidæ. The female, being a desirable acquisition, was of course made a specimen of immediately, and I need hardly say that not a single male has appeared since her removal. I was not aware of having placed in the cage any larva of P. Populi; but, on recurring to my notes of a Day in the New Forest last June, I find one of the beating for an oak on the 22nd of that month "a large gray flattish, hairy larva, irregularly marked with black," which, as it has never answered to its number in any other form, I conclude was the producer of this moth, but from which I had ceased to look for any perfect insect, concluding it to have been previously affected by some parasitical devourer. — *Octavius Pickard-Cambridge; Bloxworth House, Dorset, December* 14, 1854.

Remarkable Vitality in a Specimen of Sitona fusca.—I was much surprised this morning, on taking up a phial containing insects collected at Petersham on the 28th of September, to find a specimen of Sitona fusca alive, having been seven weeks all but one day in the bottle. The laurel-leaves which had been enclosed with it still retained a considerable aroma, though not of course that hydrocyanic smell which is so quickly fatal to all insects. The Sitona was not only alive, but vigorous, travelling along at little less than the customary pace, and much more actively than many Curculios do when in full health. In the same bottle, which contains barely a cubic inch, and was well corked, were three more of the same species, together with Apion striatum and others, Halticæ, Atomariæ, Demetrias atricapillus, Notoxus monoceros and some small Brachelytra, all, however, quite dead. I have remarked, in introducing insects into a phial with laurel-leaves, that the Brachelytra are usually the first to yield, then the Malacoderma and Geodephaga, and that the Curculeonidæ resist the influence longest; Diptera and Hymenoptera seem very soon overcome. It is somewhat remarkable that one Sitona should appear little affected under circumstances that killed three others.—*George Guyon; Richmond, November* 15, 1854.

PROCEEDINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY.

Donations.

November 6, 1854.—EDWARD NEWMAN, Esq., President, in the chair.

The following donations were announced, and thanks ordered to be given to the donors:—'Entomologische Zeitung,' July to October; by the Entomological Society of Stettin. 'Revue et Magasin de Zoologie,' 1854, No. 9; par M. F. E. Guérin Méneville; by the Editor. 'Journal of the Society of Arts' for October; by the Society. The 'Athenæum' for October; by the Editor. The 'Literary Gazette' for October; by the Editor. The 'Zoologist' for November; by the Editor. 'Smithsonian Contributions to Knowledge,' vol. vi.; 'Seventh Annual Report of the Board of Regents of the Smithsonian Institution for 1852;' 'Directions for Collecting, Preserving, and Transporting Specimens of Natural History,' 2nd Edition; 'Registry of Periodical Phenomena,' one sheet; 'Catalogue of the Described Coleoptera of the United States,' by Friedrick Ernst Melsheimer, M.D., revised by S. S. Haldeman and J. L. Le Conte, 1 Vol. 1853 (6 copies); 'List of Foreign Institutions in Correspondence with the Smithsonian Institution;' 'Natural History of the Red River of Louisiana;' (reprinted from the Report of Captain R. B. Marcy); all by the Smithsonian Institution, Washington, U.S. 'Boston Journal of Natural History,' vol. vi. No. 3; 'Proceedings of the Boston Society of Natural History,' pp. 225 to 384, November, 1852, to April, 1854; both by the Boston Soc. Nat. Hist. 'Proceedings of the Royal Society,' vol. vi. No. 102; 'Philosophical Transactions of the Royal Society,' Vol. cxliii. Part 3, Vol. cxliv, Part 1; 'List of the Royal Society, 30th November, 1853;' all by the Royal Society. Plutella annulatella (2) and Tinea ochraceella (2); by George Wailes, Esq. A box of Scotch Lepidoptera and Coleoptera; by Mr. Foxcroft.

Election of a Member.

Professor Edward Solly, F.R.S., F.L.S., &c., was ballotted for and elected a Member of the Society.

Exhibitions.

Mr. Stevens exhibited a new British beetle, Otiorhynchus septentrionis, *Herbst*, a single specimen taken by Mr. Foxcroft at Rannoch. He also exhibited some insects sent from Port Natal by Mr. Plant, including the rare Goliathus Derbyanus and Tefflus Delargorguei; also two living examples of an Iulus which were imported in a case of plants, and had been in his possession more than a fortnight.

Mr. Salt sent for exhibition a fly presented to him by a medical friend, who wrote concerning it "It was apparently blown out through the nostril by a gentleman who had long had pain in the face, and discharge of pus from the nose and throat. It is supposed to have been lodged in the 'antrum of Highmore,' a cavern that exists naturally in the bones of the face." It appeared to be Phora urbana. Mr. Westwood said he had reared species of this genus of fly from wool and animal rejectamenta, such as old crab-shells. Mr. Walker had reared them from Fungi, and Mr. Curtis from the body of one of the Sphingidæ.

Mr. Stainton exhibited a specimen of the rare Elachista triseriatella, taken by Mr. Hogan near Dublin, and specimens of a new Simaëthis, for which he proposed the name S. Parietariæ, the larvæ having been found by Mr. Harding on Parietaria officinalis.

Luminosity of Helobia brevicollis.

Mr. Westwood said Mr. Gould had placed in his hands a specimen of the common beetle Helobia brevicollis, which he found one evening lately near Windsor, having been attracted thereto by its luminous appearance. Mr. Westwood thought the luminosity was due to adherent particles of phosphorescent matter arising from some decaying animal, or a Geophilus—one of the luminous Scolopendræ—on which the Helobia had been feeding; both these views, indeed, had been advanced with respect to a luminous Goerius, at a Meeting of this Society on December 1st, 1851, by the late Mr. Stephens, Mr. Curtis, and Mr. Smith.

Motion communicated to Seeds by Insects.

Mr. Janson, adverting to the Report of the discussion on this subject at the last meeting, said that in his remarks on that occasion he did not mean to deny that *any* motion could be communicated to the seeds by the imprisoned larvæ, but he still maintained that the possibility of larvæ, perfectly enclosed in seeds, having the power of causing the seeds to *jump* had not been explained. The instance quoted from Kirby and Spence he did not think was analogous, for that was evidently a naked chrysalis unencumbered by an extraneous envelope.

Mr. Westwood read the statement in Kirby and Spence's 'Introduction,'* which had been referred to, where, alluding to Réaumur's Memoir upon the enemies of caterpillars, they say, "Round the nests of the Processionary Bombyx he found numerous little cocoons suspended by a thread, three or four inches long, to a twig or leaf, of a shortened oval form and close texture, but so as the meshes might be distinguished. These cocoons were rather transparent, of a coffee-brown colour, and surrounded in the middle by a whitish band. When put into boxes or glasses, or laid in the hand, they surprised him by leaping. Sometimes their leaps were not more than ten lines, at others they were extended to three or four inches, both in height and length. When the animal leaps, it suddenly changes its ordinary posture (in which the back is convex and touches the upper part of the cocoon, and the head and arms rest upon the lower) and strikes the upper part with the head and tail, before its belly, which thus becomes the concave part, touches the bottom. This occasions the cocoon to rise in the air to a height proportioned to the force of the blow." In the same chapter of the 'Introduction' it is also recorded by the author, "that in 1810 a young lady informed him a friend had brought a similar chrysalis, which was found attached by one end to the leaf of a bramble. It repeatedly jumped out of an open pill-box that was an inch in height. When put into a drawer, in which some other insects were impaled, it skipped from side to side over their backs, for nearly a quarter of an hour, with surprising agility. Its mode of springing seemed to be by balancing itself upon one extremity of its case. About the end of October one end of the case grew black, and from that time the motion ceased; and about the middle of April in the following year a very minute ichneumon made its appearance by a hole it had made at the opposite end." Réaumur could not ascertain the fly that should legitimately come from the cocoon, for different cocoons gave different flies: whence it was evident that these ichneumons were infested by their own parasite. This might have been the case with the cocoon mentioned by the lady.

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* Vol. ii. page 299, 4th Edition.

Mr. Westwood said, that though in this account the *chrysalis* was stated to be attached to the leaf, yet it was evidently an enclosed pupa, for its *case* is immediately afterwards mentioned. Since the last meeting he was satisfied the larvæ in the seeds were Lepidopterous, and thinking it possible that only those seeds moved that contained a larva infested by an ichneumon, he had inquired of Sir William Hooker if there were any exceptions, among the affected seeds, in the power of jumping, but was informed all gave equally strong leaps.

Mr. Curtis said that at the last meeting he had observed "he expected the seeds contained the larva of a Bruchus," and in confirmation of Réaumur, and of the possibility of an insect confined in a hard case having the power to give it motion, he had stated that "he had a compact horny oval cocoon formed by an ichneumon, which bounded about on a table like an India-rubber ball, shortly before the fly hatched." In order to identify the fact with the insect, he had searched for and found the specimen which had been disregarded for twenty years, and he now had the satisfaction of exhibiting the insect with its cocoon, and the label attached to it when the fly hatched. It was a Campoplex allied to C. majalis, *Grav.*, and probably described by that author; but the species of this genus being very difficult to identify, he would not venture to characterise or name it. These Ichneumonidæ are parasititic on the Tortricidæ and smaller moths, and also on the Curculionidæ.

Mr. Lubbock said it would not be difficult to demonstrate, according to the laws of matter and motion, that the muscular power of an insect in the situation referred to, if exerted in a particular manner, would cause a jumping motion in its envelope.

A new British Cynips and the Galls made thereby.

Mr. Rich, present as a visitor, exhibited some sprays of oak thickly covered with bunches of large galls. In Somersetshire generally, and in part of Gloucestershire, they were so abundant that the oaks were covered with them, to the extinction of the acorns, the loss of which, for feeding their pigs, the farmers greatly regretted, although he believed that in the value of these galls they had more than an equivalent, for their chemical qualities were nearly equal to those of the imported galls of commerce.

Mr. Curtis said, Mr. Rich recently gave him an example of this gall, and he had since received some of the galls with a specimen of the fly from his friend W. H. L. Walcott, Esq., who obtained these galls from an oak growing near the Hotwells, Clifton. Having paid great attention to the Cynipidæ,* and bred most of those which are produced from oak trees, he had often been doubtful regarding the true Cynips Quercus-petioli of Linnæus, but he was convinced the specimen he now exhibited, which was bred with a few others from the galls alluded to, is the Linnean species. He believed all that have hatched are females, but as there are many maggots alive in some of the galls he expected the males would appear in the spring.

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* Vide vols. i. ii. iii. iv. and v. of the 'Gardener's Chronicle,' for the economy and figures of Cynips aptera, C. umbraculus, C. Quercus-tiaræ, C. lenticularis, C. Quercus-pedunculi, C. Quercus-ramuli, C. Quercus-castaneæ, and C. Quercus-folii.

Cynips Quercus-petioli is described by Linnæus in his 'Fauna Suecica,' No. 1523, where he refers to Rœsel, who has given good figures of the galls, fly, &c.* The flies are much larger than any other species which has been described as British, and they are nearly allied to those produced from the galls of commerce, the Diplolepis gallæ-tinctoriæ of Olivier. He was inclined to think the species was of recent introduction into England, for during the time of his researches into the Cynipidæ neither he nor the many friends who assisted him with specimens from all parts of the country had ever seen it, and such conspicuous galls could hardly have escaped notice if they had existed.

Mr. Stainton said that for the last four or five years he had noticed these galls in Devonshire, but not in such profusion as now stated.

The President said he had some doubts if this was the Cynips Quercus-petioli of Linnæus, for the galls were situated in the axil of the leaf, and not on the petiole.

Chrysomelidæ of Australia.

Mr. Baly read the concluding portion of his Memoir on the Chrysomelidæ of Australia.

New Part of the Transactions.

Part 2, vol. iii. N. S. of the Transactions, published in October, was laid on the table.

December 4, 1854.—EDWARD NEWMAN, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'Catalogue of the Birds in the Museum of the East India Company,' Vol. i.; by the Hon. Court of Directors of the East India Company. The 'Literary Gazette' for November; by the Editor. The 'Athenæum' for November; by the Editor. The 'Zoologist' for December; by the Editor. The 'Journal of the Society of Arts' for November; by the Society. 'Revue et Magasin de Zoologie,' No. 10, 1854; by the Editor. 'Insecta Britannica,' Diptera, Vol. ii., by F. Walker; 'Lepidoptera—Tineina,' by H. T. Stainton; by the Committee of the 'Insecta Britannica.' 'List of Specimens of Lepidopterous Insects in the Collection of the British Museum,' Part i. Lepidoptera—Heterocera; 'List of Specimens of Dipterous Insects in the Collections of the British Museum,' Part v. Supplement 1; 'List of Specimens of Neuropterous Insects in the Collection of the British Museum,' Part iv., Odonata; 'List of the Specimens of British Animals in the Collection of the British Museum,' Part xiv., Nomenclature of Neuroptera; all presented by Mr. F. Walker. The First Annual Supplement to 'Insecta Britannica, Lepidoptera—Tineina,' by H. T. Stainton; by the author.

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* 'Insecten Belustigung,' iii. Supp., tab. 35 and 36.

Election of a Member.

George Wailes, Esq., Newcastle-on-Tyne, was balloted for and elected a Member.

Exhibitions.

Mr. Pickersgill exhibited a fine specimen of Argynnis Lathonia, and a variety of Vanessa Urticæ in which the colours of the upper wings were not distinct but suffused, and the under wings were almost entirely black. Both these butterflies he caught near Eastbourne, Sussex, on the 29th of July last.

Mr. Saunders exhibited two examples of a small patelliform nidus, probably of a spider, attached to a leaf of Chailetia latifolia received from Rio Negro.

Mr. Stevens exhibited some Coleopterous larvæ, which had destroyed a large cherry-tree drooping by forming galleries in the solid wood, a log of which he also showed. The larvæ were probably those of Gnorimus nobilis.

Mr. Tweedy exhibited a box of Coleoptera and Lepidoptera, among which were some new species, just received in fine condition from St. Domingo.

Photographic Representations of Insects.

Herr Pretsch, Manager of the Imperial Printing Office at Vienna, present as a visitor, exhibited a great number of magnified positive photographs of various insects and parts of insects.

Mr. Westwood observed, that though these figures gave very good general representations of the objects, yet the details were not sufficiently accurate for entomological purposes; indeed, he had never seen the small parts of insects delineated by this process with the clearness necessary to render the figures of scientific value.

Mr. Curtis thought that, if greater distinctness in detail could be attained, the photographic process would be invaluable for representations of the wings of the Ichneumonidæ and the neuration of wings generally.

Singular Specimen of Anthocharis Cardamines.

The President exhibited a specimen of Anthocharis Cardamines, which had been placed in his hands by Mr. W. Machin, of Mile End: the insect combined the characters of the sexes in a remarkable manner: the whole of the upper surface of the upper wings, as well as the antennæ, head, thorax and abdomen, present the normal appearance of a female: there was nothing whatever to induce a doubt of the individual being a female: the same observation applied to the left wings on the under side, but the right upper wing on the under side was adorned with the bright orange mark distinctive of the male. Many insects were known to be subject to what he (the President) had called *hemigynism*, *i. e.* when the individual is divided by a right line down the back, the one half being male and the other half female; the peculiarities of each sex extending not only to the distribution of colour, but also to the structure of the antennæ, eyes and genitalia; but the present instance differed from any that he had previously seen, in the fact of the entire upper surface being female.

Introduction of Bombyx Cynthia into Malta and Italy.

Mr. Westwood exhibited a sample of the silk produced at Malta from cocoons of Bombyx Cynthia, which sample was given by the Governor, Sir William Reid, to Dr. Templeton, and by him forwarded to Mr. Westwood with the following letter:—

"Valetta, November 10.

"My dear Westwood,

"I take advantage of the Governor's kind offer to send you the enclosed silk, *unwound* from the Cynthia cocoons by Signor Lotteri, an Italian, skilled in silk-winding, who declared that his fingers stuck together for a very long time afterwards, so gummy and resiny was the binding matrix of the silk. The result seems very fine, and is, I believe, very strong, in comparison with the silks of similar thickness. At Casal Zebbourg a gentleman introduced, from the Governor's gardens, some of the worms, got little boys to tear the cocoons to pieces, and native women to spin it; and there is now hanging, in the window of Mr. Goodenough's shop, a pair of stockings and some lace-work made from the spun silk: the stockings have a muddy look, the colour of the enclosed, but in other respects appear fine substantial affairs, such as country people would be glad to get; and I believe they are everlasting. The great business is to get a machine to tear the cocoons to pieces, and that will soon follow, I presume. They have got the worm now into Tripoli in a fine healthy state; and planting castor-oil plant is now the order of the day everywhere.

"I trust the packet of live cocoons arrived safe, which were sent to you by the Governor's directions, per last mail. His Excellency was much pleased by the note in the 'Athenæum' respecting them.

"Very truly yours,
(Signed) "R. Templeton."

Mr. Westwood added that he had received the cocoons referred to, and found that some at least of the pupæ inclosed were alive, notwithstanding the long journey and the change of temperature to which they had been subjected.

The Secretary read, from the 'Journal of the Society of Arts,' November 10, the following extract from a despatch forwarded by Governor Sir William Reid to his Grace the Duke of Newcastle:—

"We have here in Malta gone through all the operations as practised in Assam, except weaving the silk thread into cloth. For this we have not yet a sufficient quantity; but the worms are breeding here faster than we can rear the castor-oil plant: they are now (in October) thriving in the open air, and as they consume the leaves of the castor-oil, they travel from plant to plant, feeding upon several, but apparently doing well only on the Ricinus.

"The French Government have applied, through their Consul, for a larger quantity of eggs, both for France and Algeria, and I have been enabled to supply him with as many as he requires.

"In consequence of statements published in the 'Journal of the Society of Arts,' I have had an application from the Agricultural and Horticultural Society of Grenada, in the West Indies, for eggs of this silkworm. Some fresh cocoons will be sent from hence to Grenada, and I am not without hope, from the way in which they are being conveyed, and with the assistance of the Directors of the Royal Mail Steam Company, that eggs in a sound state will reach the West Indies."

The Secretary also read the following extract from the 'Turin Gazette,' inclosed in the above-mentioned despatch:—

"*Culture of Silk in Piedmont.*—Sig. Vincenzo Griseri, the first person who has undertaken the rearing of the Bombyx Cynthia worm upon leaves of the castor-oil plant, and the first who introduced it into France, has now terminated his second experiment of rearing the said worms. Sig. Griseri, conceiving the great service that these valuable insects might render in the production of silk, diligently distributed them to the various provinces of the State, as also in Brianza, and has received from all quarters accounts of a successful result. He succeeded last spring in rearing these worms even upon the castor-oil plants while in the ground and in the open air, in the garden of the Chemical Laboratory, under the observation of Chevalier Cantu, Director of that establishment, the Minister, Conte de Cavour, his Excellency the Duke of Guiche, Minister Plenipotentiary of France, Professors Abbenne and Borsarelli, and many other distinguished personages. From this mode of treatment Signor Griseri discovered that these worms do not suffer from a low temperature, nor from strong winds, nor from continued rain; but, on the contrary, he obtained finer and better-formed cocoons than those produced by the ordinary method, all which circumstances have been submitted to the Royal Academy. After the first experiment he published, through the printers Chirio and Mina, the mode of bringing up these worms. In the second experiment he also fully succeeded, and found that the cocoons were superior to those brought from Calcutta and Malta, on which account he came to the conclusion that this new silkworm, a native of Bengal, has found its own climate in our country. An experiment is now being made as to the mode of extracting the silk, which has been confided to the care of able throwsters, and from some samples already produced it results that this silk is finer and more elastic than our common silk; further, two more important facts have just been communicated by Sig. Griseri, namely, that he has succeeded in feeding these worms exclusively upon willow-leaves and lettuce-leaves, and has obtained cocoons similar to those produced from the leaves of the castor-oil plant. During these experiments Sig. Griseri was assisted by the Countess Marianna Antonini, an experienced producer of silk, and Sig. Francesco Comba, a distinguished naturalist, who kindly offered him their aid and advice. Sig. Griseri intends next spring to try the rearing of our native grubs, the Pavonia major and the Pavonia minor, which feed upon various wild plants, and yet produce silk, as he has already confirmed this by experiment. There is reason to believe from these experiments made by so celebrated a silk-grower, well known by the numerous services he has rendered in rearing and improving the race of silkworms, that the culture of silk will receive a development, the limit of which can hardly be foreseen, as the object is nothing less than to convert the vegetable matter of the most common leaves into the valuable substance of silk."

Larvæ preserved in Canada Balsam.

Mr. Westwood said he had received examples of insect larvæ preserved in Canada balsam, by a gentlemen in Zurich, and he wished to state that they could be furnished at a very reasonable rate.

Galls produced by Cynips Quercus-petioli.

Mr. Stainton, adverting to the mention of this subject at the last meeting, read the following extract of a letter received from R. C. R. Jordan, Esq., of Queen's College, Birmingham:—

"The galls are old friends of mine, I have known them for twenty years: of late they have been more common. I have here some fine specimens of the Cynips, or rather, in searching them out, I have four specimens: I have known the Cynips for three years. About five years ago a medical man at Lympstone, near Exmouth, used them always to make his ink, and tried to impress upon the country people the use that might spring from making them an article, so to speak, of exportation. But of course, as with all other things of this sort, they would gather the galls for him to make the ink, when paid for it, but never made any attempt to sell them elsewhere. They would be a good substitute for the nut-galls, and deserve to be used instead.

"The Cynips appears in September, perforating the gall by a single round hole. The galls themselves are first green, afterwards brown: the larvæ may be occasionally found in them in spring. I have never found any other than a Cynips larva in the galls: in the common cherry-like gall on the under side of the oak leaves, there is a larva of a saw-fly occasionally, and I have a notice of an ichneumon-parasite on the Cynips."

Mr. Stainton added that, since the last meeting, he had ascertained these galls were more than usually abundant this year in Devonshire.

Mr. Curtis hoped that Mr. Stainton would procure some of these galls, for he still doubted if those seen by Mr. Stainton and Mr. Jordan were identical with those he had referred to Cynips Quercus-petioli.

Mr. Westwood said he had announced the discovery of this species in England, in the 'Gardener's Chronicle,' some time since.

Larva of Ctenicerus murinus.

Mr. Curtis read a letter from the Rev. C. A. Kuper Trellich, Monmouthshire, stating that he had found, under a loose stone, a larva of a reddish colour, which he believed to be that of Ctenicerus murinus. The locality was the top of a wall in an elevated bleak situation, whereon stems of gorse had been laid and had decayed, in which stems, he presumes, the larvæ feed, for he had often found the perfect insects thereon while immature.

Locality of Papilio Antenor, Drury.

Mr. Westwood stated that this butterfly was long known only by the figure of Drury, until Mr. Hope received a specimen, taken, as he stated, by Ritchie, at Soudan, in Central Africa, which, however, was doubted by Mr. Edward Doubleday, who considered the species to be an Asiatic form. He had now to announce that the British Museum had just received a specimen from Madagascar. Was it possible the species could have so wide a geographical range, or had there been some error in the former instance?

Mr. Westwood also took this opportunity to state, as bearing upon this subject, that a beetle, Pachylomerus femoratus, stood in Mr. Hope's collection as African;

another species or sub-species of the genus had now been received from Mozambique, on the Eastern Coast of Africa, and yet it had a great resemblance to the forms from Tropical Western Africa.

Economy of various Insects.

Mr. Curtis read a paper entitled 'Notes on the Economy of Various Insects.'

Essay on the British Formicidæ.

Mr. Smith read 'An Essay on the Genera and Species of the British Formicidæ,' in which twenty-eight species were described, being an addition of eleven species to the list of species known in 1851.—*J. W. D.*

SOCIETY OF BRITISH ENTOMOLOGISTS.

November 7, 1854.—Mr. H. HARDING, President, in the chair.

Messrs. Jobson, Thorne and Oxley were balloted for and admitted subscribers to the Society.

The President exhibited a box containing, in great variety, the Peronea cristana, and remarked on the extraordinary abundance in which that insect had occurred during the present year, and contrasted this with its apparent scarcity during several preceding years: he also exhibited some specimens of Eudorea murana, which he bred from lichens found on old walls; the insects were accompanied by the pupa cases: also specimens of Depressaria liturella with its food, a species of wild mint; and a new insect allied to Cochylis stramineana.

December 5, 1854.—Mr. HARDING, President, in the chair.

The President exhibited the following Lepidoptera:—

Peronea Schalleriana, together with its pupa-case and food-plant, the common meadow-sweet (*Spiræa Ulmaria*).

Cnephasia subjunctana, together with its pupa-case and food-plant, the small spreading rest-harrow (*Ononis reclinata*): the larva spins together the leaves of this plant, thus making a domicile in which to undergo its transformations.

Cnephasia Perterana, with pupa-case and food-plant: the larva draws together the petals of the mouse-ear hawkweed (*Hieracium Pilosella*), and feeds on the stamens.

Cnephasia Virgaureana, with pupa-case: the food of this species varies greatly; the President had bred specimens from the common crowfoot, blackthorn and other plants; many others of the genus are not particular on what plant they feed.

Sericoris lacunana, with pupa-case and food-plant, the common millefoil (*Achillea millefolium*); the larva draws together the leaves which protect the young buds, and feeds on the interior or heart of the bud.

Coleophora Viminetella, with pupa-case and food-plant, the common sallow (*Salix capræa*): a good description of this insect would be found in the 'Insecta Britannica' (Tineina, vol. iii. p. 223).

Coleophora Onosmella, with pupa-case and food-plant, the viper's bugloss (*Echium vulgare*).

13 JA 55

TO ENTOMOLOGISTS.

R. FOXCROFT begs to return his sincere thanks to the Trustees of
the British Museum, the Nobility, Gentry and Clergymen, and also particularly
Members of the Entomological Society, for the patronage he has received for a
r of years; and he takes the liberty of informing them and others, that he intends
g another journey into Scotland, for the purpose of collecting Insects, during the
er of 1855: he purposes devoting seven months to collecting in England and
nd, commencing early in March, and intends collecting through England on his
and from Scotland. Mr. Foxcroft, to enable him to carry out this plan, wishes
e a sufficient sum by Subscriptions of £1 3s. each Subscriber, who shall be entitled
specimens of the order he particularly wishes to obtain: the whole of the Insects
ted to be shared in November, on Mr. F.'s return: the boxes in which the Insects
delivered to the Subscriber to be his property. Mr. F. hopes, by visiting different
ities, to take many rare and new species, thus affording an excellent opportunity to
men of obtaining desirables to their collections. Subscribers are respectfully
sted to send their Subscriptions in by the 1st of March; if by Post-Office Order to
ade payable at 210, Oxford Street, London. No person to be allowed to subscribe
r the 1st of March, and no one to be considered a subscriber until he has paid his
scription of £1 3s. Any person Subscribing £2 4s. will be entitled to specimens of
he orders of Insects which may be captured. Subscribers of £1 3s. to receive two
imens of all the species captured of such order as he may subscribe for.

Note.—James Foxcroft has always a great variety of British Insects on Sale. All
s of Collecting and Store Boxes, Cabinets, &c., all kinds of Breeding Cages, Cabinets
Shells, Fossils, &c., made to order on the lowest terms.

P.S.—Persons subscribing for Coleoptera will have no Lepidoptera; those who sub-
be for Lepidoptera will have no Coleoptera.

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R. J. C. STEVENS will Sell by Auction, at his Great Room,
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ned by a Gentleman who is giving up the Study on account of ill health), contained
well-made Mahogany Cabinet of 40 Drawers, and comprising many Rarities, mostly
he best condition. Also the Collection of British and Foreign Insects of the late
l Ingpen, Esq., A.L.S.; and the Cabinets of Geodephagous Coleoptera of the highest
r, of a well-known Collector. May be viewed on Saturday and Mornings of Sale,
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stamps.

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mbling, Mealy Redpoll, Capercally, Spotted Redshank, Wood Sandpiper, Green-
k, Jack Snipe, Broad-billed Sandpiper. Pintail and Scoter Ducks, Bluck-throated
r, &c. Catalogues, containing Particulars relating to EACH Specimen, may be had
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Books received for Review:—

'Prodromus Faunæ Zeylonicæ.' By E. F. Kelaart. Van Voorst. 10s. 6d.
'Insecta Maderensia.' By T. V. Wollaston. Van Voorst. £2 2s.
'Entomologists' Annual.' By H. T. Stainton. Van Voorst. 2s. 6d.

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